

System for Educating Radiation Protection in the Czech Republic

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Introduction

Radiation Protection as an interdisciplinary subject involving physics, engineering, interaction of ionizing radiation with matter, last but not least modelling of radiation transport by the Monte Carlo method and medicine has become increasingly important in connection with the development and implementation of new sophisticated methods and technologies utilizing ionising radiation in nuclear energy, application of ionizing radiation in industry and science and medicine. In accordance with new legislation reflecting the relevant EC directives, the Czech Technical University has innovated the master degree programmes related to the use of ionizing radiation.

In the Czech Republic nine faculties, Czech universities, associated with CENEN (Czech Nuclear Education Network) are involved in nuclear education. An important role is played in this association by the West Bohemian University in Plzen, in a place where a significant part of the Czech nuclear industry is concentrated.

CENEN works closely with European partners in the ENEN (European Nuclear Education Network), an organization that aims to harmonize access to nuclear education in Europe, to integrate a European education system in the field of nuclear safety and radiation protection, and to achieve better cooperation between academic resources and national and international capacities. The general objectives of the ENEN Association are defined as follows:

- to develop a more harmonized approach for education in the nuclear sciences and nuclear engineering in Europe;
- to integrate European education and training in nuclear safety and radiation protection; and
- to achieve better co-operation and sharing of academic resources and capabilities at the national and international level.

The CENEN objectives are aligned with the ENEN objectives.



Metodologya

Special attention is paid to radiation protection during teaching of medical physics and of analytical method using ionising radiation. Of particular importance is radiation protection in medicine, in the teaching of Medical physics is that it is the largest controllable radiation source in the world. Medical uses of radiation constitute more than 99 % on radiation exposure to the world's population from man-made sources. Two Universities in the Czech Republic has prepared a master degree programmes in medical physics, the Czech Technical University in Prague and Masaryk University in Brno. These programs are organized in cooperation with partner institutions, including departments of radiotherapy, nuclear medicine and radio diagnostics in hospitals. This project is important with respect to general problems of health care treated by the new legislation, and is directly linked to the future fields of interest of the national professional organization of medical physicists, which plays an important role in the preparation of teaching both in the Master's program and in the further specialization and postgraduate education of radiological physicists. Teaching materials on radiation protection of both patients and staff, e.g. Radiation Dose Management in Computed Tomography or Safety and Quality in Radiotherapy,

Subject: Radiation Protection 4+0

Abstract:

The aim of the subject is to provide a self-contained overview of the radiation protection with a special focus on general principles. The subject is based on the actual ICRP recommendation no. 103 and other documents, which specifies radiation protection in the Czech Republic and EU. The course is accepted as training, which allows obtaining special competence in radiation protection. Participants will receive an appropriate certificate of attendance when fulfil all requirements defined in the permit of State Office of Nuclear Safety of the Czech Republic.

Outline:

- 1) Biology in radiation protection
- 2) Biological effects of ionizing radiation
- 3) Units, quantities, basic terms in RP
- 4) Dosimetry of external irradiation I.
- 5) Dosimetry of external irradiation II.
- 6) Internal dosimetry I.
- 7) Internal dosimetry II.
- 8) Radon and dispersion models
- 9) Shielding of ionizing radiation
- 10) Radiation protection in medicine
- 11) Epidemiology for radiation protection
- 12) System of radiation protection I.
- 13) System of radiation protection II.

Courses:

The university organizes specialized courses to deepen the education. Courses are mainly organized for industry, research and government officials. Such a typical course organized at Faculty of Nuclear Sciences and Physical Engineering, TU in Prague is two-year, four-semester course, each semester contains several weeks of teaching. In nuclear-related courses, the subject of radiation protection along with subjects such as nuclear physics, ionizing radiation interactions with matter, dosimetry, detectors, modelling of Monte Carlo radiation transport, and legislation are a very important part of such a course.

According to the valid legislation in the Czech Republic, a worker wishing to acquire special professional competence for activities of particular significance from the point of view of radiation protection must have a special course containing a summary of the most important knowledge of the field and the corresponding legislation. Radiation protection is an integral part of these courses.

International Collaboration:

The faculty also organizes courses for students of foreign universities. Within the framework of the CHERNE cooperation (CHERNE is an open European academic network for Cooperation in Higher Education on Radiological and Nuclear Engineering and Radiation Protection, <https://www.upv.es/cherne/>) within the framework of the ERASMUS program and the follow-up projects, the two weeks courses are held every year at the partner universities.

Radiation protection belongs to the program of these courses Radiation protection is the subject of the ATHENS courses organized by ATHENS Network and are held at the faculty each year. ATHENS Network (Advanced Technology Higher Education Network /Socrates) is made up of 14 European technological universities and nine Paris Tech Graduate Schools of Engineering, <http://athensnetwork.eu/>.